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Infrastructure

Guide

pour l'utilisation de répéteurs Polycom dans les constructions protégées de la protection civile

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Préambule

Le présent document vise à faciliter la planification et la réalisation de l'installation de répéteurs Polycom dans le cadre du projet global "Extension des systèmes télématiques destinés aux emplacements de conduite protégés actifs".

Ce document s'adresse en premier lieu aux entreprises agréées, ainsi qu'aux bureaux d'ingénieurs chargés de la planification générale des systèmes télématiques.

Destinataires:

Supports numériques

Internet, téléchargement disponible www.protpop.ch

Supports imprimés, sur demande

- Entreprises intéressées
- Bureau d'ingénieurs chargé de la planification (1 ou 2 par canton)
- Exploitants des réseaux partiels

Exemplaires d'information

- OFCOM
- BAC
- armasuisse

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1 Bases

- Loi fédérale du 4 octobre 2002 sur la protection de la population et sur la protection civile (LPPCi)
- Ordonnance du 5 décembre 2003 sur la protection civile (OPCi)
- Instructions et instructions techniques de l'Office fédéral de la protection de la population (OFPP) concernant les ouvrages de protection
- Instructions techniques concernant la résistance aux chocs des éléments montés dans les constructions de protection civile (IT CHOCS)
- Guide Extension des systèmes télématiques
- Ordonnance du 23 décembre 1999 sur la protection contre le rayonnement non ionisant (ORNI)
- Guide de l'Office fédéral de la communication (OFCOM) NT-3002 – Réémetteurs PMR
- Conditions et prescriptions Polycom, édition du 10 décembre 2010

2 Utilisation et fonction des répéteurs Polycom

L'équipement des emplacements de conduite protégés actifs (constructions protégées) des états-majors de conduite régionaux sera complété par divers moyens télématiques modernes. Les membres de l'état-major des différentes organisations partenaires telles que sapeurs-pompiers, police, protection civile, etc., doivent pouvoir utiliser leurs propres appareils radio portatifs Polycom à l'intérieur de la construction protégée également pour les communications externes.

A cet effet seront installés des répéteurs Polycom spéciaux. Les liaisons Polycom doivent être disponibles en tout temps pour les cas de catastrophe, sans mesures techniques ou organisationnelles particulières.

Souvent, des répéteurs GSM seront exploités simultanément.

3 Homologation / Exigences

Dès le 1er janvier 2012, les répéteurs Polycom à installer devront faire l'objet d'une homologation préalable.
Le Recueil d'exigences techniques et la liste des appareils agréés seront publiés sur Internet. www.protpop.admin.ch

Au titre d'une disposition transitoire, les répéteurs Polycom admis jusqu'ici pourront encore être installés sans homologation jusqu'au 31 décembre 2012 au plus tard.

4 Déroulement du projet

En règle générale, l'offre et l'installation de répéteurs Polycom se feront par construction protégée, s'inscrivant dans le cadre de projets globaux incluant la téléphonie, le raccordement Internet, la télévision et l'installation de câbles à 2500 MHz intégrée à grande échelle dans les constructions protégées.

Un bureau d'ingénieurs est chargé du projet global et en assume la responsabilité. Le maître d'ouvrage est généralement la commune d'implantation.

La partie du projet consacrée aux répéteurs Polycom se déroule comme suit:

- Demande d'offre au fournisseur par le planificateur général
- Détermination de la station de base Polycom attribuée. L'exploitant du réseau partiel (en général, la police cantonale) procède à l'attribution sur la base de l'occupation, du scénario "Black-out Suisse", etc.
- Examens et mesures relatifs au choix de l'emplacement des antennes
- Offre au planificateur général, à l'attention du maître d'ouvrage
- Choix du fournisseur par le planificateur général et le maître d'ouvrage
- Dépôt du projet auprès de l'OFPP par le planificateur général, via l'office cantonal
- Examen et approbation du projet global par l'OFPP
- Mise en place préalable, par l'installateur-électricien, des câbles Sucofeed et boîtes de raccordement d'antennes. En outre, raccordement à courant fort pour les répéteurs (selon la construction protégée, avec ou sans découplage du câble EMP)
- Montage des antennes intérieures et extérieures pour les répéteurs (y compris les câbles de raccordement)
- Annonce du fournisseur à l'exploitant du réseau partiel, de la mise en service du répéteur
- Montage et mise en exploitation du répéteur par le fournisseur
- Mesure et consignation des câbles d'antennes installés
- Annonce à l'OFCOM, avec copie à l'exploitant du réseau partiel et à l'OFPP (chiffre 7.4 et annexe 2)
- Etablissement et dépôt de la documentation de la construction (chiffre 9)
- Réception, par le planificateur général, de tous les appareils et installations électriques, avec procès-verbal selon la norme SIA 118 (chiffre 8)
- Contrôle final par l'OFPP
  Participants: OFPP, canton, planificateur général, installateur-électricien, maître d'ouvrage (chiffre 10)

5 Constructions protégées

5.1 Vue d'ensemble de la construction (exemple)

Les constructions protégées à équiper sont généralement des postes de commandement, qui ont été construits en tant qu'ouvrages indépendants ou combinés avec d'autres constructions. La plupart des constructions protégées ont été conçues sur le modèle illustré ci-après. Des différences sont toutefois possibles.

Fig. 1 Vue en plan d'un emplacement de conduite protégé actif (exemple)

5.2 Schémas (exemples)

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Schéma d'exploitation radio

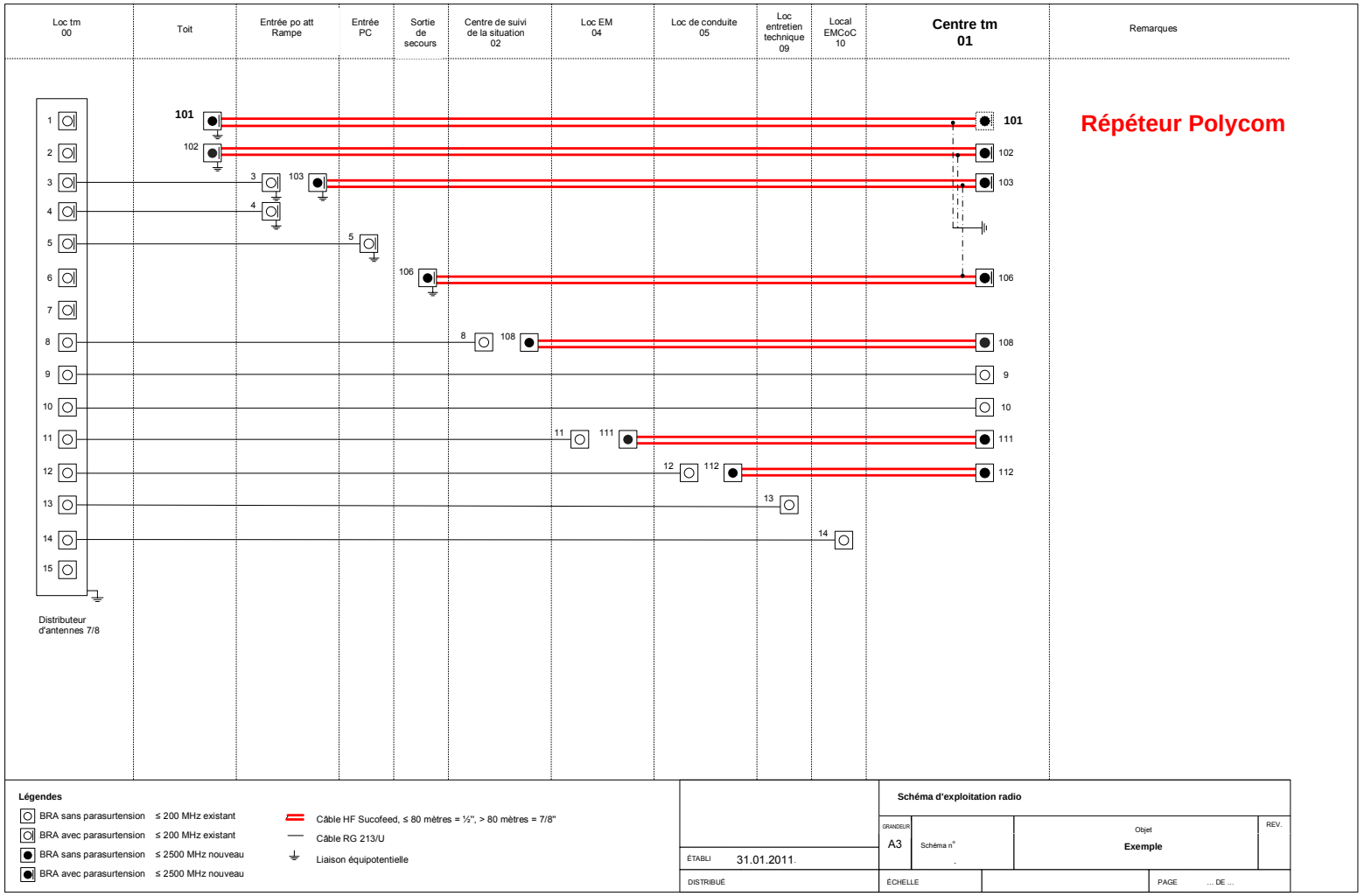
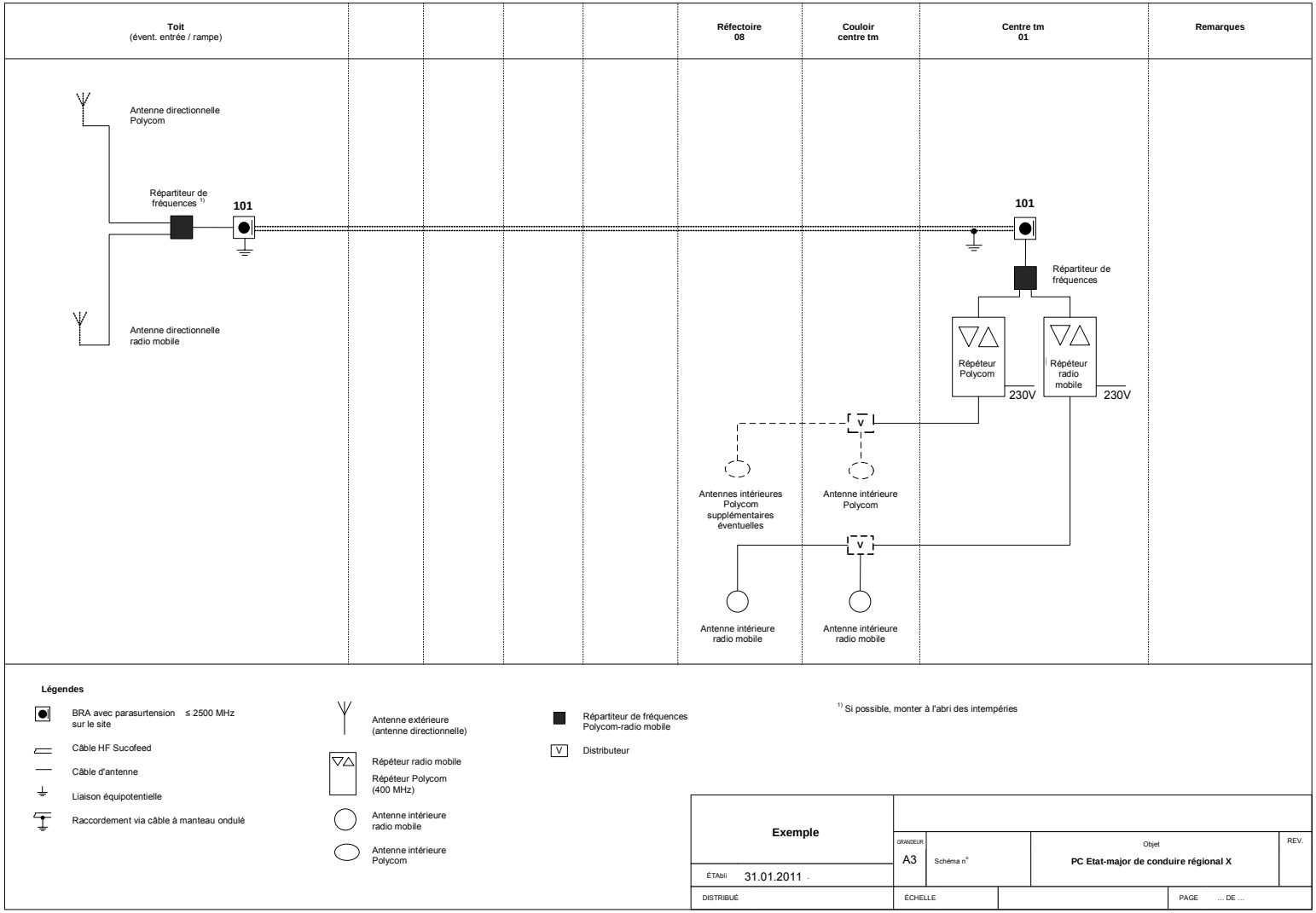


Schéma de principe répéteur Polycom et répéteur radio mobile



6 Antennes

Le montage extérieur des antennes est soumis à l'Ordonnance sur la protection contre le rayonnement non ionisant (ORNI) et aux exigences en matière d'aménagement local, ainsi qu'au règlement de construction local qui porte notamment sur la hauteur de l'ouvrage, les procédures d'autorisation, etc.

6.1 Vue d'ensemble de l'emplacement des antennes

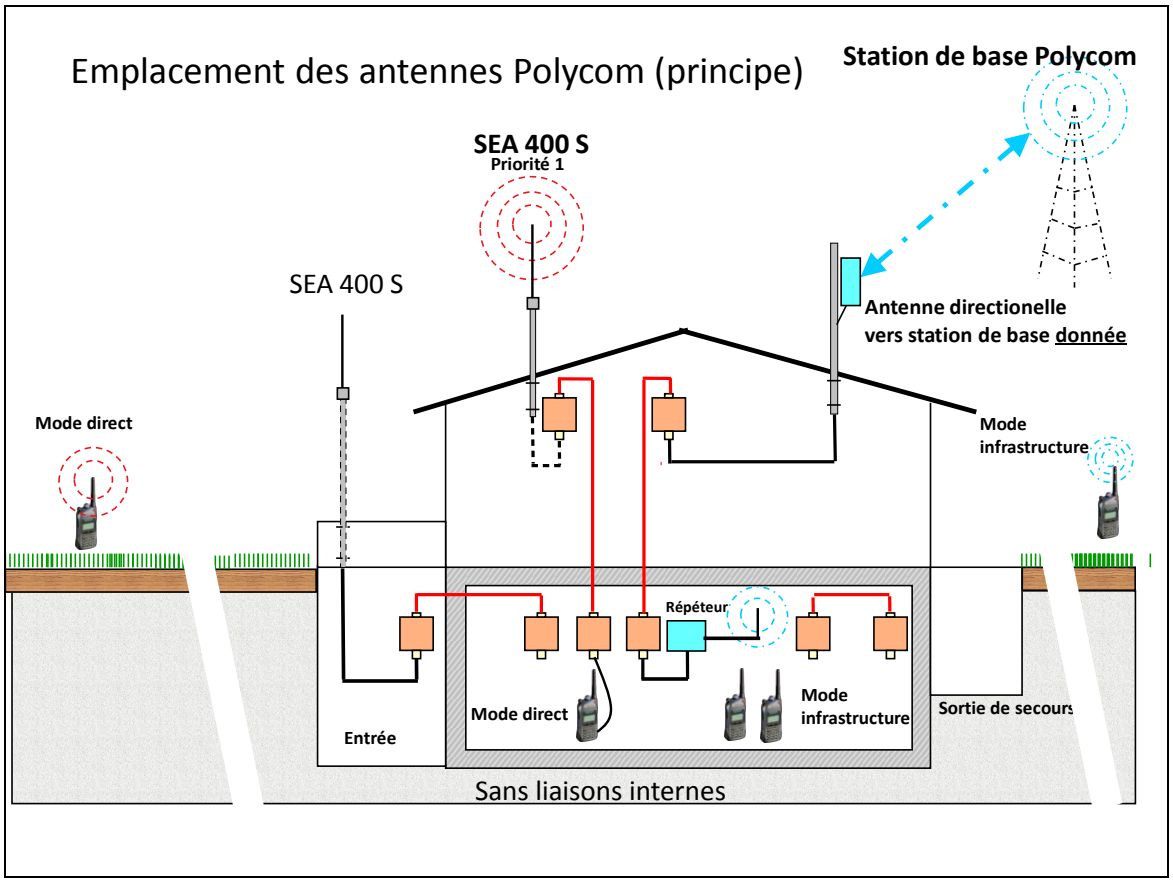


Fig. 2 Emplacement des antennes

6.2 Antennes omnidirectionnelles pour l'exploitation en mode direct

Indépendamment du répéteur Polycom, il est possible de prévoir des antennes omnidirectionnelles (SEA 400 S) supplémentaires pour une exploitation directe. Selon l'emplacement, celles-ci ne seront montées qu'en cas de besoin par l'organisation de protection civile, puis démontées après utilisation.

Fig. 3 Antenne SEA 400 S à côté d'une antenne directionnelle

Fig. 4 Antenne SEA 400S séparée, dans l'aire d'entrée

6.3 Antennes directionnelles pour répéteurs Polycom

Pour la liaison à la station de base Polycom attribuée, il convient d'utiliser des antennes directionnelles selon la liste de matériel pour les constructions munies de répéteurs Polycom (annexe 3). La plupart du temps, les antennes sont montées sur le toit ou, lorsque cela se révèle impossible, dans l'aire d'entrée de la construction protégée. S'il est possible de dissimuler l'antenne, par exemple dans des combles, il faut privilégier cette solution.

Le niveau de réception (Rx) mesuré à la station de base doit s'élever à **≥ 60 dBm**.

On attachera une attention particulière au découplage entre l'antenne directionnelle et l'antenne omnidirectionnelle SEA 400 S. L'antenne SEA 400 S ne doit pas se situer dans la zone directe de rayonnement de l'antenne directionnelle. L'atténuation entre les deux antennes devrait être d'au moins 45 dB, ce qui correspond à une distance horizontale d'environ 15 mètres. Si l'antenne SEA 400 S est montée au-dessus de l'antenne directionnelle, cette atténuation suppose une distance verticale d'au moins 1,50 mètre.

Lors du dimensionnement de l'installation d'antennes, on veillera aussi aux points suivants:

- Il devrait exister, si possible, une liaison en vue directe entre l'antenne du répéteur et l'antenne de la station de base (Base Transceiver Station, BTS).
- L'antenne du répéteur doit disposer d'un faible angle d'ouverture, ainsi que d'un gain et d'un rapport avant/arrière (front-to-back ratio) élevés (antenne en nappe).
- Les conditions locales devraient être exploitées de manière optimale, excluant si possible toute liaison en vue directe entre l'antenne du répéteur et l'antenne SEA 400 S.
- L'antenne du répéteur et l'antenne SEA 400 S doivent être aussi éloignées que possible l'une de l'autre, tant horizontalement que verticalement.
- L'antenne du répéteur doit autant que possible être dirigée à 180 degrés à l'opposé de la position de l'antenne SEA 400 S.
- Le signal d'une installation avec antenne SEA 400 S doit, à l'entrée du répéteur, être plus faible que les signaux de réception de la station de base.
- Le répartiteur de fréquences éventuellement nécessaire doit, si possible, être monté à l'abri des intempéries.

Fig. 5 Superstructure du toit

Fig. 6 Combles

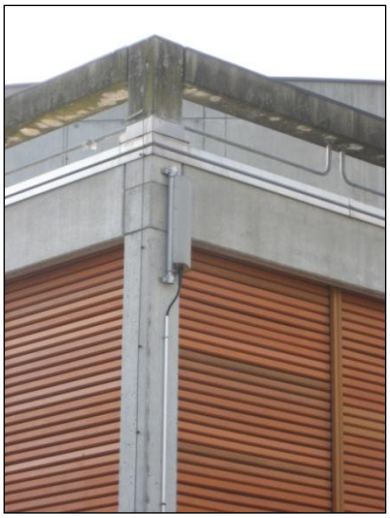


Fig. 7 Façade

Fig. 8 Entrée/Sortie de construction en champ libre

Fig. 10 Toit

Fig. 9 Boîte de raccordement d'antenne à 2500 MHz, avec parasurtension, douille N

7 Répéteur

7.1 Emplacement

Le répéteur doit être monté dans le centre télématique, en règle générale à proximité des boîtes de raccordement d'antennes à 2500 MHz (orange) préinstallées.

Fig. 11 Centre télématique, emplacement possible pour répéteur et répartiteur de fréquences

7.2 Fixation du répéteur

Les répéteurs d'un poids minimal de 10 kg doivent être fixés conformément aux Instructions techniques concernant la résistance aux chocs des éléments montés dans les constructions de protection civile (IT CHOCS 1995).

7.3 Alimentation à 230 V

La prise pour le répéteur doit être placée à plus de 2 mètres au-dessus du sol, afin d'en empêcher le libre usage. Il convient en outre d'y apposer un écriteau portant le texte suivant, inscrit en rouge: "Prise pour répéteur uniquement! Sans disjoncteur de courant résiduel (RCD)".

S'il s'agit d'une construction protégée équipée contre les impulsions électromagnétiques (IEM/EMP), la prise destinée à l'alimentation en courant fort du répéteur, préinstallé, doit être découplée de la protection EMP au moyen d'une prise de terre Woertz avec parasurtension spéciale.

7.4 Annonces

La mise en exploitation du répéteur doit être annoncée au préalable à l'exploitant du réseau partiel (en général, la police cantonale).

La mise en exploitation sera suivie, dans un délai d'un mois, d'une annonce à l'OFCOM (affunk@bakom.admin.ch), avec copie à l'exploitant du réseau partiel et à la direction du projet Polycom (gis-POLYCOM@babs.admin.ch). Voir exemple, annexe 2.

7.5 Couverture de l'alimentation/intensité de champ

Doivent être alimentés les locaux suivants:
L'ancienne désignation est mentionnée entre parenthèses.

- **Local de conduite** (*local de commandement*)
- **Local d'état-major** (*local du chef de service*)
- **Local logistique** (*secrétariat*)
- **Chef d'état-major, commandant de la protection civile** (*chef local*)
- **Centre de suivi de la situation** (*renseignements, local d'alarme et d'émission*)
- **Centre télématique** (*centre des transmissions*)
- **Réfectoire**

Le maître d'ouvrage peut désigner des locaux supplémentaires.

Le niveau dans les locaux imposés doit atteindre au minimum **-87 dBm**, ce qui correspond à une très bonne qualité et garantit un établissement des appels sans aucune défaillance.

8 Réception

La réception selon la norme SIA incombe au planificateur général/bureau d'ingénieurs chargé du projet.

Les câbles d'antennes nouvellement installés doivent obligatoirement être mesurés et consignés explicitement.

9 Documentation de la construction relative au répéteur

La documentation de la construction doit au moins contenir les informations suivantes:

- Informations générales (lieu, construction, coordonnées, adresse, informations de contact pour les annonces de dérangement)
- Plan de situation (p. ex. extrait de carte 1:25 000)
- Schéma de circuit
- Schéma de principe de l'installation
- Situation d'alimentation (plan avec valeurs mesurées)
- Photos (antennes extérieure et intérieure, répéteur, répartiteur de fréquences éventuel)
- Procès-verbaux de mesure
- Mode d'emploi (au minimum, fiche technique et description des avis/annonces de dérangement)
- Fiche technique pour l'antenne directionnelle
- Fiche technique pour la ou les antennes extérieures

Exemplaires à remettre:
1 exempl. papier dans la documentation générale de la construction protégée
1 exempl. sur CD dans la documentation générale de la construction protégée
1 exempl. sur CD auprès du planificateur général, à l'attention de l'OFPP

Le maître d'ouvrage peut exiger des exemplaires supplémentaires.

10 Contrôle final par l'OFPP

Dans le cadre du contrôle final du projet global "Extension des systèmes télématiques", la fonction du répéteur fait l'objet d'un examen par sondages au moyen d'un appareil radio portatif. On ne procède en général à aucune mesure.

11 Exploitation / Entretien

Il convient de communiquer à l'exploitant de la construction protégée, ainsi qu'à l'exploitant du réseau partiel un numéro de téléphone pour les annonces de panne, etc.

Annexes

1 Liste d'entreprises agréées pour l'installation des répéteurs Polycom

2 Exemple de formulaire d'annonce à l'adresse de l'OFCOM

3 Liste de matériel pour les constructions munies de répéteurs Polycom

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de la protection de la population et des sports DDPS

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Infrastructure

Liste d'entreprises agréées pour l'installation des répéteurs Polycom dans les constructions protégées

(Extension des systèmes télématiques, ch. 2.2.4)

Etat: **1er juin 2011**
La liste actuelle se trouve sur le site internet de l'OFPP.
www.protpop.admin.ch

Les entreprises citées ci-dessous disposent des connaissances et du personnel nécessaire pour réaliser correctement l'installation des répéteurs Polycom reconnus par l'OFPP selon la planification dans les constructions protégées de la protection civile.

ComLab AG
Ey 13
Ch-3063 Ittigen
031 924 24 24
www.comlab.ch

Enkom Ingenys AG
Schellenrainstr. 13
6210 Sursee
041 348 02 00
www.enkom.com

Enkom Romandie SA
rte de la Venoge 3
1026 Echandens

www.enkom.com

Nägele-Capaul
Rorschacherstr. 279
9016 St. Gallen
071 282 90 00
www.naegele-capaul.com

WZ Wassmer
+ Zürcher Antennensysteme AG
Spinnereistrasse 2
5300 Turgi
056 268 61 61
www.wassmerzuercher.ch

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Réference: Persönlich

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[Niveau hiérarchique 4]

Exemple "Annonce à l'OFCOM"

(Guide Répéteurs Polycom, chiffre 7.4)

Utilisation de l'installation radio fixe
Installations de radiocommunication (PMR) sur des fréquences exclusives ou communes

Lieu	Objet	Service radio	Emetteur-récepteur	Dépendance par rapport au lieu	Altitude [m.a.d.n.m.]	Direction (azimut)	Hauteur	Inclinaison (tilt)	Gain	Polarisation	Fréquence Rx	Fréquence Tx	Fonction	Nombre de canaux	Puissance de l'antenne	Puissance rayonnée dans la construction protégée	Zone de couverture
Village AAA	constr PCi	UHF Polycom	XXX-Ouest	539190 / 170835	460 m	210	4 m	D 1,5	8,5	Verticale	390-395 MHz	380-385 MHz	SD	8	100 mW	50 mW	Construction
Village BBB	constr Pci	UHF Polycom	Montagne BBB	612335 / 200475	867 m	340	3 m	U 15	6	Croisée	390-395 MHz	380-385 MHz	SD	8	100 mW	50 mW	Construction
Village CCC	constr Pci	UHF Polycom	Hubel	703980 / 245605	520 m	157	10 m	D 5	11,5	Verticale	390-395 MHz	380-385 MHz	SD	8	100 mW	50 mW	Construction
				/													
				/													
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constr PCi = poste de conduite dans la construction protégées de la protection civile
m.a.d.n.m. = mètres au-dessus du niveau de la mer

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Liste de matériel

pour l'utilisation de matériel spécial destiné aux répéteurs Polycom dans les constructions de la protection civile

	Ind	Date	Vis	Modifications		Traité par	
Edition	a	7.7.2011	Su	Première édition		OFPP: Tru-Su	
	b						
	c					**Tél.** 031 322 52 15	
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	e						Index a
	Validation		Date: 7.7.2011		Visa: FB TS, Tru		

Préambule

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Table des matières

1 Boîtes de raccordement d'antennes
2 Antennes extérieures
3 Antennes intérieures
4 Répartiteurs de fréquences

1 Boîtes de raccordement d'antennes

Pour les installations radio à 2500 MHz, il convient d'utiliser les boîtes de raccordement d'antennes illustrées ci-après. Ces boîtes, peu courantes sur le marché, sont fournies par l'OFPP.

Boîte de raccordement d'antenne à 2500 MHz <u>avec</u> parasurtension,
douille N, orange
Utilisée pour les liaisons vers l'extérieur

Boîte de raccordement d'antenne à 2500 MHz <u>sans</u> parasurtension,
douille N, orange
Utilisée pour les liaisons à l'intérieur de la construction

2 Antennes extérieures

- Kathrein 800 10252
- Kathrein 741 515
- Kathrein 739 504
- CompleTech CA390X 7/16 Swiss Edition
- CompleTech CAXS2
- CompleTech CAX+
- Kathrein 742 290
- Kathrein 800 10046

Multi-band Panel
Vertical Polarization
Half-power Beam Width

380 – 500

V

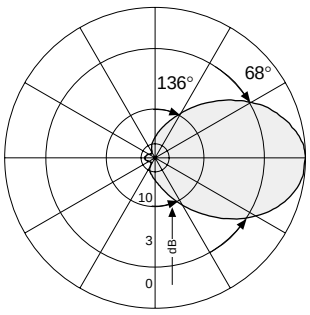
65°

KATHREIN
Antennen · Electronic

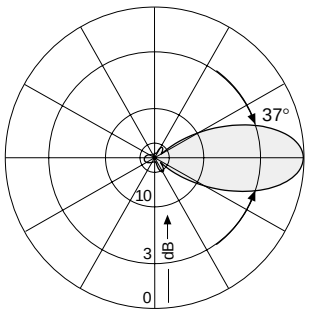
VPol Panel 380–500 65° 12dBi

Type No.	**800 10252**	
Frequency range	**380 – 500**	
	380 – 430 MHz	430 – 500 MHz
Polarization	Vertical	Vertical
Gain	11.5 dBi	12 dBi
Half-power beam width	Horizontal: 68° Vertical: 37°	Horizontal: 63° Vertical: 32°
Front-to-back ratio, copolar	> 18 dB	> 20 dB
Impedance	50 Ω	
VSWR	< 1.5	
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc	
Max. power per input	500 W (at 50 °C ambient temperature)	

380 – 430 MHz

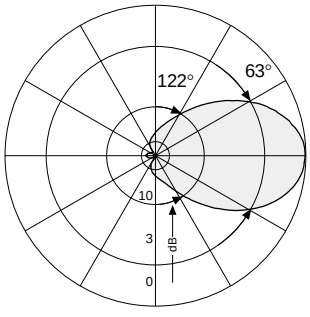


Horizontal Pattern

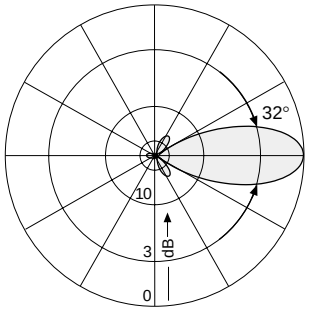


Vertical Pattern

430 – 500 MHz



Horizontal Pattern



Vertical Pattern

Mechanical specifications	
Input	1 x 7-16 female
Connector position	Rearside
Weight	12 kg
Wind load	Frontal: 550 N (at 150 km/h) Lateral: 220 N (at 150 km/h) Rearside: 715 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	1062 x 562 x 274 mm
Height/width/depth	992 / 492 / 190 mm

936.2469/a Subject to alteration.

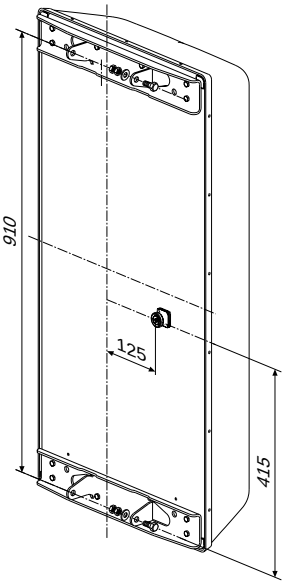
Internet: http://www.kathrein.de

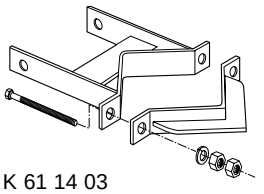
KATHREIN-Werke KG · Anton-Kathrein-Straße 1 – 3 · P.O. Box 10 04 44 · D-83004 Rosenheim · Germany · Telephone +49 8031 184-0 · Fax +49 8031 184-973

Accessories (order separately)

Type No.	Description	Remarks	Weight approx.	Units per antenna
733 736	2 clamps	Mast: 50 – 125 mm diameter	6.2 kg	1
K 61 14 03	2 clamps	Mast: 116 – 210 mm diameter	4.6 kg	1
K 61 14 04	2 clamps	Mast: 210 – 380 mm diameter	6.5 kg	1
K 61 14 05	2 clamps	Mast: 380 – 521 mm diameter	9.4 kg	1
733 695	1 downtilt kit	Downtilt angle: 0° – 25°	3.4 kg	1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.





K 61 14 03

Material:
Reflector screen: Weather-proof aluminum.
Radiator: Tin-plated copper.
Fiberglass radome: Fiberglass material guarantees optimum performance with regards to stability, stiffness, UV resistance and painting. The colour of the radome is grey.
All screws and nuts: Stainless steel.

Grounding:
The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

Environmental conditions:
Kathrein cellular antennas are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E.
The antennas exceed this standard with regard to the following items:
– Low temperature: –55 °C
– High temperature (dry): +60 °C

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Environmental tests:
Kathrein antennas have passed environmental tests as recommended in ETS 300 019-2-4. The homogenous design of Kathrein's antenna families use identical modules and materials. Extensive tests have been performed on typical samples and modules.

Please note:

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

The mechanical design is based on the environmental conditions as stipulated in ETS 300 019-1-4, which includes the static mechanical load imposed on an antenna by wind at maximum velocity.
Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of an antenna or even cause it to fall to the ground. These facts must be considered during the site planning process.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.
The details given in our data sheets have to be followed carefully when installing the antennas and accessories.
The limits for the coupling torque of RF-connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.

936.2469/a Subject to alteration.

Internet: http://www.kathrein.de

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Panel
Dual Polarization
Half-power Beam Width

380 – 500

X

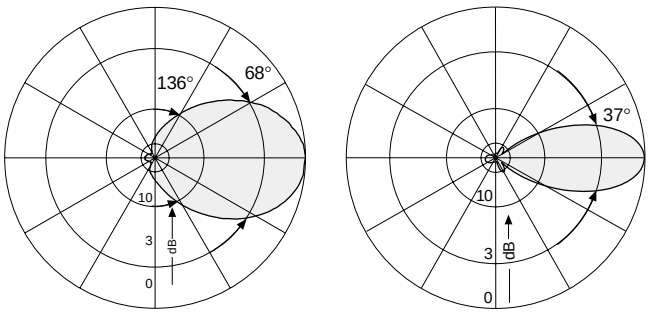
65°

KATHREIN
Antennen · Electronic

XPol Panel 380–500 65° 12dBi

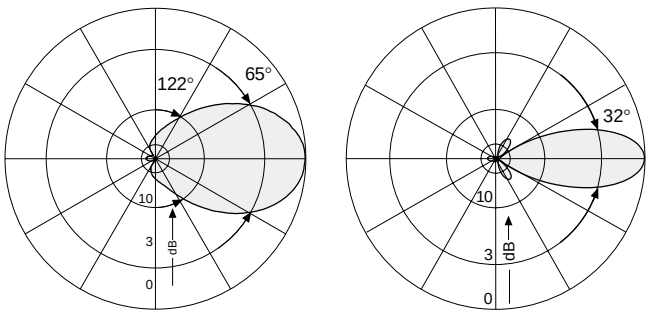
Type No.	**741 515**	
Frequency range	**380 – 500**	
	380 – 430 MHz	430 – 500 MHz
Polarization	+45°, –45°	+45°, –45°
Gain	11.5 dBi	12 dBi
Half-power beam width Copolar +45°/–45°	Horizontal: 68° Vertical: 37°	Horizontal: 65° Vertical: 32°
Front-to-back ratio, copolar	> 25 dB	
Isolation	> 30 dB	
Impedance	50 Ω	
VSWR	< 1.5	
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc	
Max. power per input	500 W (at 50 °C ambient temperature)	

380 – 430 MHz

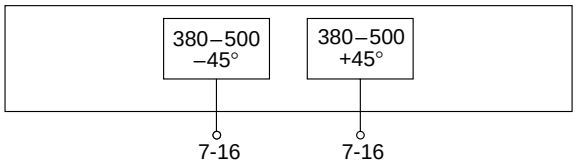


Horizontal Pattern | Vertical Pattern

430 – 500 MHz



Horizontal Pattern | Vertical Pattern



Mechanical specifications	
Input	2 x 7-16 female
Connector position	Rearside
Weight	12 kg
Wind load	Frontal: 550 N (at 150 km/h) Lateral: 220 N (at 150 km/h) Rearside: 715 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	1062 x 562 x 274 mm
Height/width/depth	992 / 492 / 190 mm

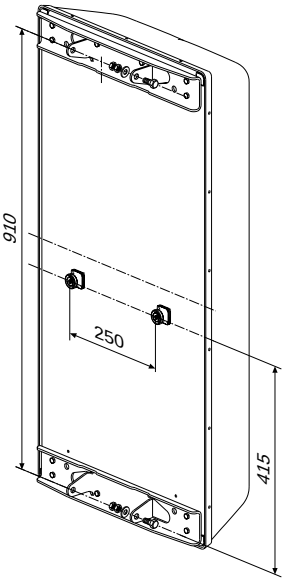
936.1835/e Subject to alteration.

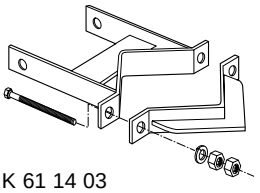
KATHREIN-Werke KG · Anton-Kathrein-Straße 1 – 3 · P.O. Box 10 04 44 · 83004 Rosenheim · Germany · Phone +49 8031 184-0 · Fax +49 8031 184-991

Accessories (order separately)

Type No.	Description	Remarks	Weight approx.	Units per antenna
733 736	2 clamps	Mast: 50 – 125 mm diameter	6.2 kg	1
K 61 14 03	2 clamps	Mast: 116 – 210 mm diameter	4.6 kg	1
K 61 14 04	2 clamps	Mast: 210 – 380 mm diameter	6.5 kg	1
K 61 14 05	2 clamps	Mast: 380 – 521 mm diameter	9.4 kg	1
733 695	1 downtilt kit	Downtilt angle: 0° – 25°	3.4 kg	1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.





K 61 14 03

Material:
Radiator: Tin-plated copper.
Reflector screen: Weather-proof aluminum.
Fiberglass radome: The grey fiberglass radomes of these antennas are very stable and extraordinarily stiff. They are resistant to ultraviolet radiation and can also be painted to match their surroundings.
All screws and nuts: Stainless steel.

Grounding:
The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

Environmental conditions:
Kathrein cellular antennas are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E.
The antennas exceed this standard with regard to the following items:
– Low temperature: –55 °C
– High temperature (dry): +60 °C

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Environmental tests:
Kathrein antennas have passed environmental tests as recommended in ETS 300 019-2-4. The homogenous design of Kathrein's antenna families use identical modules and materials. Extensive tests have been performed on typical samples and modules.

Please note:

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

The mechanical design is based on the environmental conditions as stipulated in ETS 300 019-1-4, which includes the static mechanical load imposed on an antenna by wind at maximum velocity.
Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of an antenna or even cause it to fall to the ground. These facts must be considered during the site planning process.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.
The details given in our data sheets have to be followed carefully when installing the antennas and accessories.
The limits for the coupling torque of RF-connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.

936.1835/e Subject to alteration.

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Eurocell Panel
Vertical Polarization
Half-power Beam Width

380–430

V

115°

KATHREIN
Antennen · Electronic

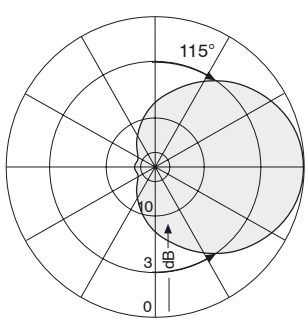
VPol Panel 380–430 115° 8.5dBi

Type No.	739 504
Frequency range	380 – 430 MHz
Polarization	Vertical
Gain	8.5 dBi
Half-power beam width	Horizontal: 115° Vertical: 38°
Front-to-back ratio	> 18 dB
Impedance	50 Ω
VSWR	< 1.5
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc
Max. power	500 W (at 50 °C ambient temperature)

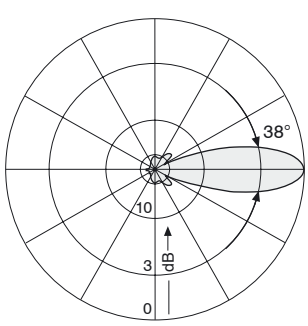
Material: Radiator: Copper, tin-plated.
Reflector screen: Weather-proof aluminum.
Radome: Fiberglass, colour: Grey.
All screws and nuts: Stainless steel.

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Grounding: The metal parts of the antenna including the mounting kit and the inner conductor are DC grounded.



Horizontal Pattern



Vertical Pattern

Mechanical specifications	
Input	7-16 female
Connector position	Bottom
Weight	4.5 kg
Wind load	Frontal: 160 N (at 150 km/h) Lateral: 100 N (at 150 km/h) Rearside: 360 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	1102 mm x 272 mm x 160 mm
Height/width/depth	974 mm / 258 mm / 103 mm

936.1492/b Subject to alteration.

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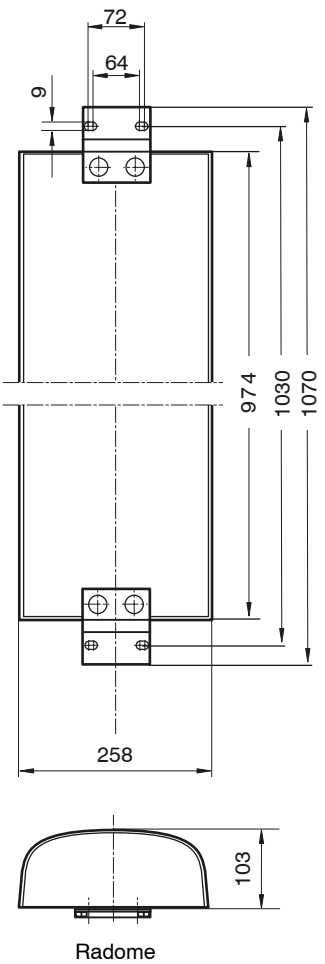
Eurocell Panels
The Approved Antenna Family
For Vertical Polarization

KATHREIN
Antennen · Electronic

Accessories (order separately)

Type No.	Description	Remarks	Weight approx.	Units per antenna
731 651	1 clamp	Mast: 28 – 64 mm diameter	330 g	2
738 546	1 clamp	Mast: 50 – 115 mm diameter	1.0 kg	2
733 677	1 clamp	Mast: 60 – 115 mm diameter	2.0 kg	2
733 678	1 clamp	Mast: 115 – 210 mm diameter	2.6 kg	2
733 679	1 clamp	Mast: 210 – 380 mm diameter	4.0 kg	2
733 680	1 clamp	Mast: 380 – 521 mm diameter	5.3 kg	2
737 973	1 downtilt kit	Downtilt angle: 0° – 21°	2.8 kg	1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.
Wall mounting: No additional mounting kit needed.



Radome

Material:
Radiator: Silver plated copper.
Reflector screen: Weather-proof aluminum.
Fiberglass radome: The grey fiberglass radomes of these antennas are very stable and extraordinarily stiff. They are resistant to ultraviolet radiation and can also be painted to match their surroundings.
All screws and nuts: Stainless steel.

Grounding:
The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

Environmental conditions:
Kathrein cellular antennas are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E. The antennas exceed this standard with regard to the following items:
– Low temperature: –55 °C
– High temperature (dry): +60 °C

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Environmental tests:
Kathrein antennas have passed environmental tests as recommended in ETS 300 019-2-4. The homogenous design of Kathrein's antenna families use identical modules and materials. Extensive tests have been performed on typical samples and modules.

Please note:

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

The mechanical design is based on the environmental conditions as stipulated in ETS 300 019-1-4, which includes the static mechanical load imposed on an antenna by wind at maximum velocity.
Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of an antenna or even cause it to fall to the ground. These facts must be considered during the site planning process.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.
The details given in our data sheets have to be followed carefully when installing the antennas and accessories.
The limits for the coupling torque of RF-connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.

936.1492/b Subject to alteration.

Internet: http://www.kathrein.de

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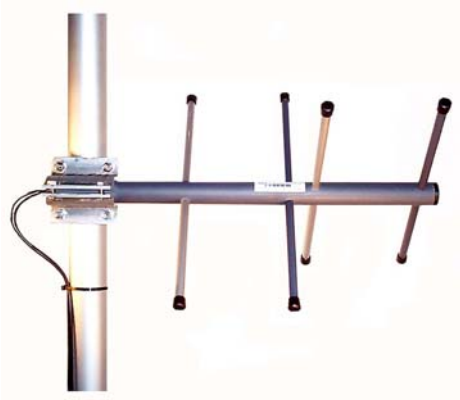
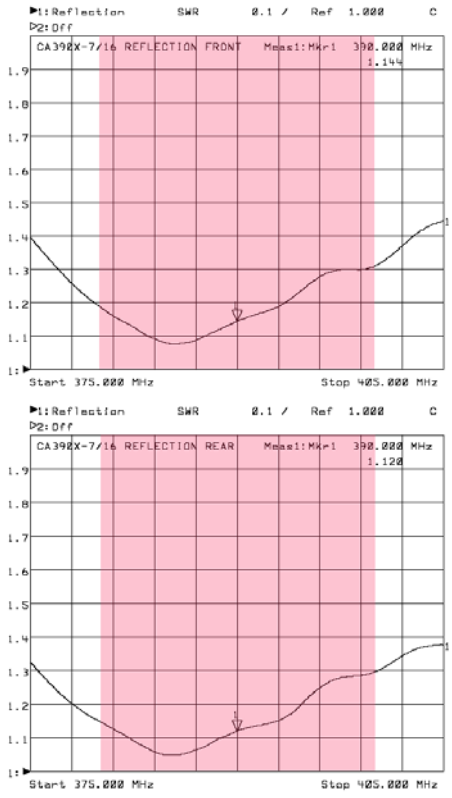
ComAnt® Communications Antennas

CA390X 7/16 SWISS EDITION CROSS-POLARIZED YAGI

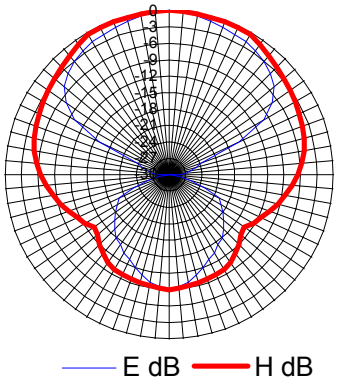


FREQUECY INDEPENDENT DATA

Description:	cross-polarized yagi, dual feed, physically quarter wavelength along the boom phased,
Frequency:	375-405 MHz
Impedance:	50 ohm
Gain:	6 dBi
Polarization:	dual/circular
Isolation:	30 dB
Connector:	2 x 7/16 male
VSWR:	< 1.5
Radome:	UV resistant ABS, RAL 7012, PU foam filling
Radiator:	copper
Passive elements:	coated aluminium
Attachment:	Ø 35-60 mm, aluminium alloy bracket, stainless steel V-bolts and self-locking nuts
Lightning protection:	DC-short circuited
Temperature:	-35° - +80° C
IP:	67



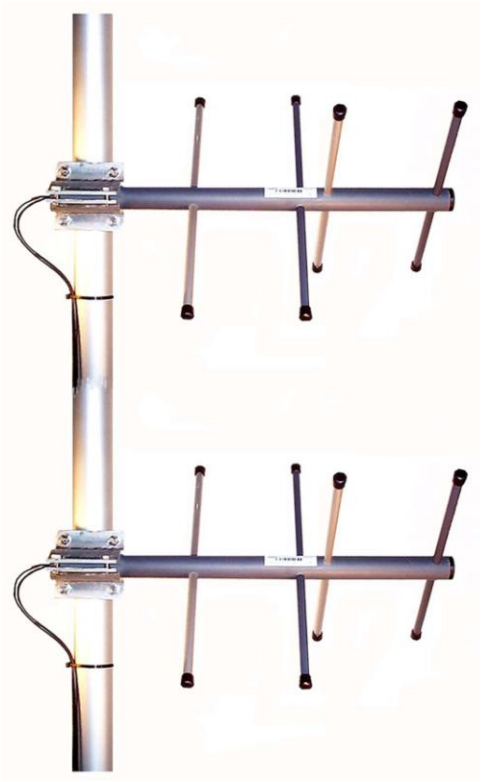
RADIATION PATTERN



CompleTech

ComAnt®-antennas by CompleTech, Finland

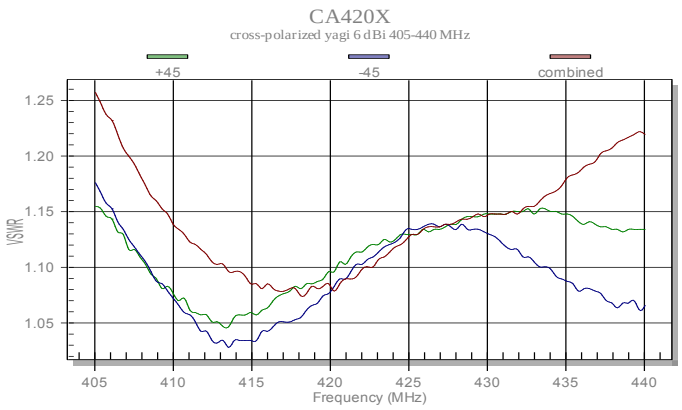
ComAnt® Communications Antennas

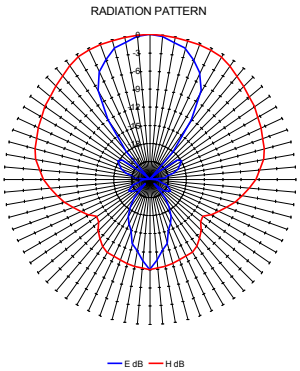


L

FREQUECY INDEPENDENT DATA

Description:	cross-polarized stacked yagi array, dual feed, physically quarter wavelength along the boom phased
Frequency:	380-410 MHz, 405-440 MHz, 440-475 MHz, 830-890 MHz, 890-960 MHz
Impedance:	50 ohm
Gain:	9 dBi
Polarization:	dual/circular
Isolation:	30 dB
Connector:	2*N-female/2*TNC-female
VSWR:	< 1.5
Radome:	UV resistant fiberglass/ABS, RAL 7012, PU foam filling
Radiator:	copper
Passive elements:	coated aluminium
Attachment:	Ø 35-60 mm, aluminium alloy bracket, stainless steel V-bolts and self-locking nuts
Lightning protection:	DC-short circuited
Temperature:	-35° - +80° C
IP:	67

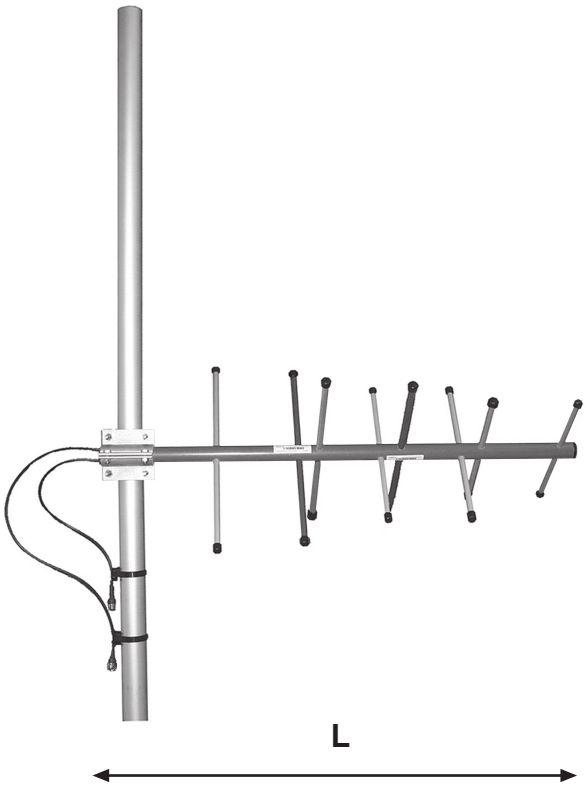




CAXS2 CROSS-POLARIZED STACKED YAGI ARRAY

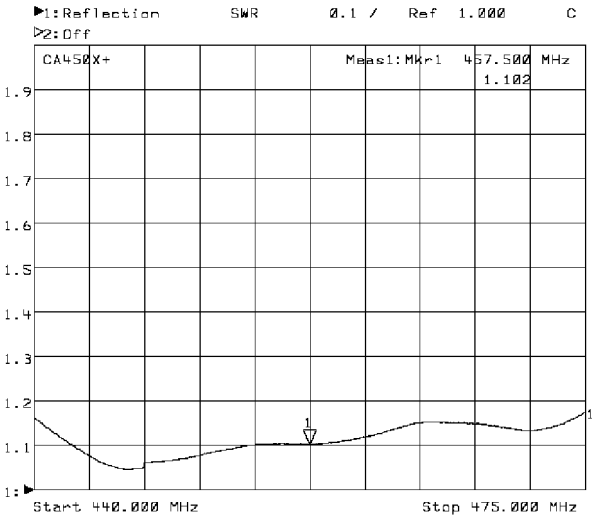
CompleTech
ComAnt-antennas by CompleTech, Finland

ComAnt® Communications Antennas

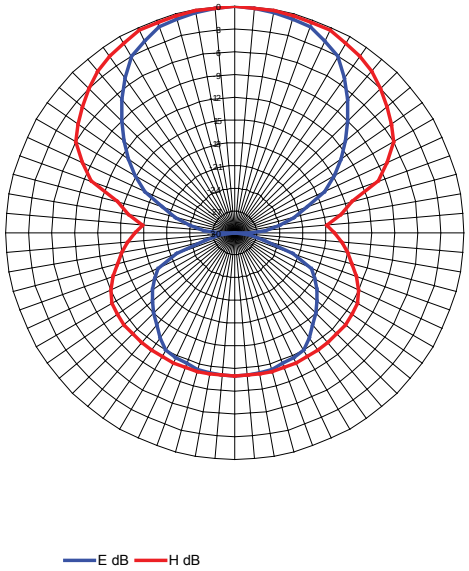


FREQUENCY INDEPENDENT DATA

Description:	cross-polarized yagi, dual feed, physically quarter wavelenght along the boom phased,
Frequency:	380-410 MHz, 405-440 MHz, 440-475 MHz, 830-890 MHz, 890-960 MHz
Impedance:	50 ohm
Gain:	8 dBi
Polarization:	dual/circular
Isolation:	30 dB
Connector:	2*N-female/2*TNC-female
VSWR:	< 1.5
Radome:	UV resistant ABS, RAL 7012, PU foam filling
Radiator:	copper
Passive elements:	coated aluminium
Attachment:	Ø 35-60 mm, aluminium alloy bracket, stainless steel V-bolts and self locking nuts
Lightning protection:	DC-short circuited
Temperature:	-40° - +80° C
IP:	67



RADIATION PATTERN



CompleTech
ComAnt®-antennas by CompleTech, Finland

CAX+ CROSS-POLARIZED YAGI

Dual-band Panel
Vertical Polarization
Half-power Beam Width
Integrated Combiner

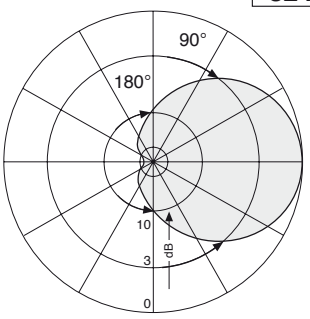
824–960	1710–2170
V	V
90°	82°
C	

KATHREIN
Antennen · Electronic

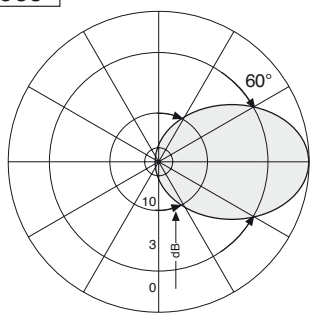
VVPol Panel 824–960/1710–2170 C 90°/82° 7/7dBi

Type No.	742 290	
Frequency range	824 – 960 MHz	1710 – 2170 MHz
Polarization	Vertical	Vertical
Gain	7 dBi	7 dBi
Half-power beam width	Horizontal: 90° Vertical: 60°	Horizontal: 82° Vertical: 70°
Front-to-back ratio	> 18 dB	> 20 dB
Impedance	50 Ω	50 Ω
VSWR	< 1.7 (824 – 960 MHz) < 1.5 (870 – 960 MHz)	< 1.7 (1710 – 2170 MHz) < 1.5 (1710 – 1990 MHz)
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc	< –150 dBc
Max. power	100 W (at 50 °C ambient temperature)	

824–960

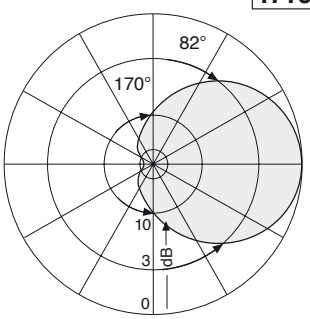


Horizontal Pattern

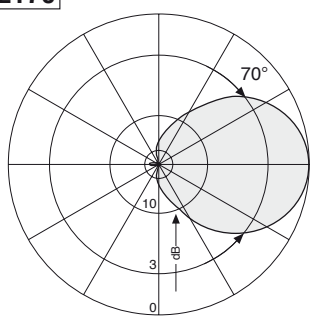


Vertical Pattern

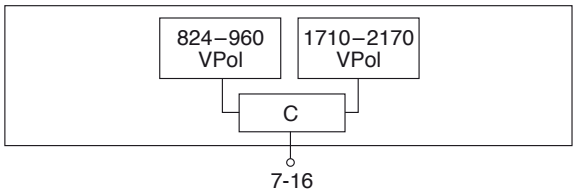
1710–2170



Horizontal Pattern



Vertical Pattern



Mechanical specifications	
Input	1 x 7-16 female
Connector position*	Bottom or top
Weight	2.8 kg
Wind load	Frontal: 90 N (at 150 km/h) Lateral: 23 N (at 150 km/h) Rearside: 100 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	444 x 172 x 92 mm
Height/width/depth	328 / 155 / 69 mm

* Inverted mounting:
Connector position top: Change drain hole screw.

936.2424/c Subject to alteration.

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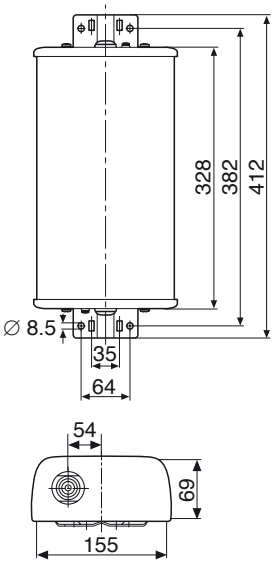
Accessories (order separately)

Type No.	Description	Remarks	Material	Weight approx.	Units per antenna
734 360	2 clamps	Mast: 34 – 60 mm dia.	Stainless steel	60 g	1
734 361	2 clamps	Mast: 60 – 80 mm dia.	Stainless steel	70 g	1
734 362	2 clamps	Mast: 80 – 100 mm dia.	Stainless steel	80 g	1
734 363	2 clamps	Mast: 100 – 120 mm dia.	Stainless steel	90 g	1
734 364	2 clamps	Mast: 120 – 140 mm dia.	Stainless steel	110 g	1
734 365	2 clamps	Mast: 45 – 125 mm dia.	Stainless steel	80 g	1
738 546	1 clamp	Mast: 50 – 115 mm dia.	Hot-dip galvanized steel	1.0 kg	2
850 10002	1 clamp	Mast: 110 – 220 mm dia.	Hot-dip galvanized steel	2.7 kg	2
850 10003	1 clamp	Mast: 210 – 380 mm dia.	Hot-dip galvanized steel	4.8 kg	2
732 327	1 downtilt kit	Downtilt angle: 0° – 40°	Stainless steel	1.0 kg	1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.
Wall mounting: No additional mounting kit needed.



Bottom view

Material: **Reflector screen and radiator:** Tin-plated copper.
Flat fiberglass radome: The max. radome depth is only 69 mm. Fiberglass material guarantees optimum performance with regards to stability, stiffness, UV resistance and painting. The colour of the radome is grey.
All screws and nuts: Stainless steel.

Grounding: The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

Environmental conditions: Kathrein cellular antennas are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E.
The antennas exceed this standard with regard to the following items:
– Low temperature: –55 °C
– High temperature (dry): +60 °C

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Environmental tests: Kathrein antennas have passed environmental tests as recommended in ETS 300 019-2-4. The homogenous design of Kathrein's antenna families use identical modules and materials. Extensive tests have been performed on typical samples and modules.

Please note: **As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.**

The mechanical design is based on the environmental conditions as stipulated in ETS 300 019-1-4, which includes the static mechanical load imposed on an antenna by wind at maximum velocity. Wind loads are calculated according to DIN 1055-4. Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of an antenna or even cause it to fall to the ground. These facts must be considered during the site planning process.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.
The details given in our data sheets have to be followed carefully when installing the antennas and accessories.
The limits for the coupling torque of RF-connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.

936.2424/c Subject to alteration.

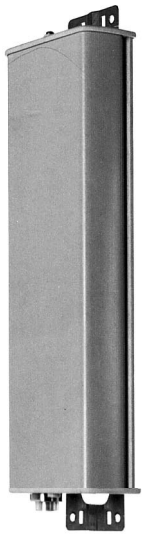
Dual-band Panel
Vertical Polarization
Half-power Beam Width
Integrated Combiner

824–960	1710–2170
V	V
90°	82°
C	

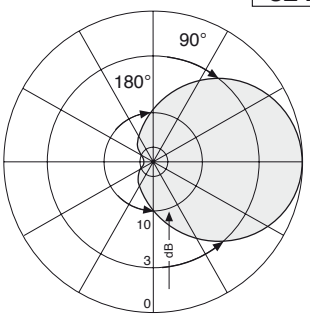
KATHREIN
Antennen · Electronic

VVPol Panel 824–960/1710–2170 C 90°/82° 10/11dBi

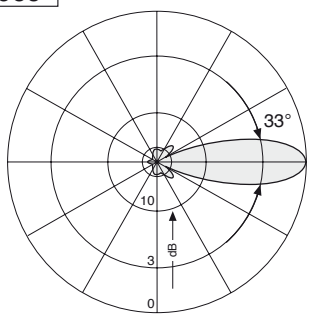
Type No.	800 10046	
Frequency range	824 – 960 MHz	1710 – 2170 MHz
Polarization	Vertical	Vertical
Gain	10 dBi	11 dBi
Half-power beam width	Horizontal: 90° Vertical: 33°	Horizontal: 82° Vertical: 19°
Front-to-back ratio	> 18 dB	> 20 dB
Impedance	50 Ω	50 Ω
VSWR	< 1.7 (824 – 960 MHz) < 1.5 (870 – 960 MHz)	< 1.5
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc	< –150 dBc
Max. power	100 W (at 50 °C ambient temperature)	



824–960

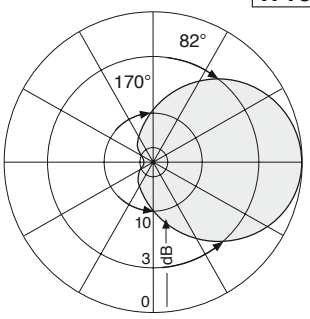


Horizontal Pattern

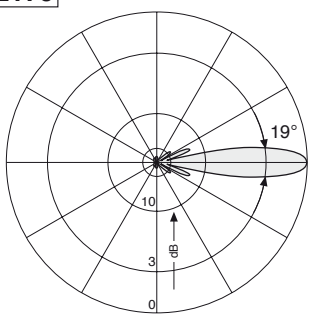


Vertical Pattern

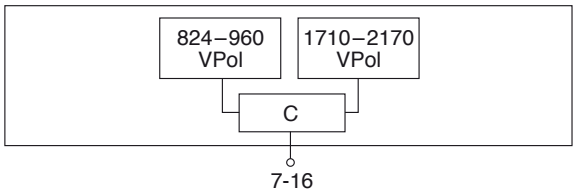
1710–2170



Horizontal Pattern



Vertical Pattern



Mechanical specifications	
Input	1 x 7-16 female
Connector position*	Bottom or top
Weight	5 kg
Wind load	Frontal: 175 N (at 150 km/h) Lateral: 47 N (at 150 km/h) Rearside: 200 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	804 x 172 x 92 mm
Height/width/depth	662 / 155 / 69 mm

* Inverted mounting:
Connector position top: Change drain hole screw.

936.2500/c Subject to alteration.

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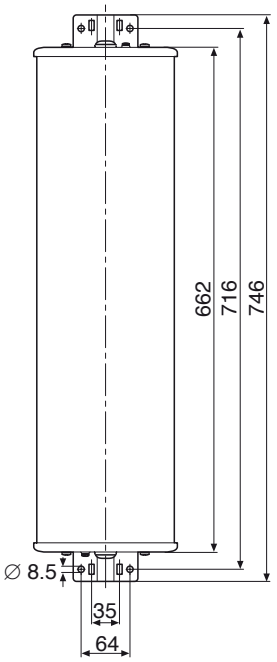
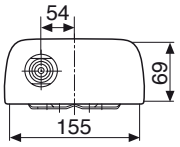
Accessories (order separately)

Type No.	Description	Remarks	Material	Weight approx.	Units per antenna
734 360	2 clamps	Mast: 34 – 60 mm dia.	Stainless steel	60 g	1
734 361	2 clamps	Mast: 60 – 80 mm dia.	Stainless steel	70 g	1
734 362	2 clamps	Mast: 80 – 100 mm dia.	Stainless steel	80 g	1
734 363	2 clamps	Mast: 100 – 120 mm dia.	Stainless steel	90 g	1
734 364	2 clamps	Mast: 120 – 140 mm dia.	Stainless steel	110 g	1
734 365	2 clamps	Mast: 45 – 125 mm dia.	Stainless steel	80 g	1
738 546	1 clamp	Mast: 50 – 115 mm dia.	Hot-dip galvanized steel	1.0 kg	2
850 10002	1 clamp	Mast: 110 – 220 mm dia.	Hot-dip galvanized steel	2.7 kg	2
850 10003	1 clamp	Mast: 210 – 380 mm dia.	Hot-dip galvanized steel	4.8 kg	2
732 321	1 downtilt kit	Downtilt angle: 0° – 20°	Stainless steel	1.0 kg	1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.
Wall mounting: No additional mounting kit needed.





Bottom view

Material: **Reflector screen and radiator:** Tin-plated copper.
Flat fiberglass radome: The max. radome depth is only 69 mm. Fiberglass material guarantees optimum performance with regards to stability, stiffness, UV resistance and painting. The colour of the radome is grey.
All screws and nuts: Stainless steel.

Grounding: The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

Environmental conditions: Kathrein cellular antennas are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E.
The antennas exceed this standard with regard to the following items:
– Low temperature: –55 °C
– High temperature (dry): +60 °C

Ice protection: Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.

Environmental tests: Kathrein antennas have passed environmental tests as recommended in ETS 300 019-2-4. The homogenous design of Kathrein's antenna families use identical modules and materials. Extensive tests have been performed on typical samples and modules.

Please note: **As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.**

The mechanical design is based on the environmental conditions as stipulated in ETS 300 019-1-4, which includes the static mechanical load imposed on an antenna by wind at maximum velocity. Wind loads are calculated according to DIN 1055-4. Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of an antenna or even cause it to fall to the ground. These facts must be considered during the site planning process.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.
The details given in our data sheets have to be followed carefully when installing the antennas and accessories.
The limits for the coupling torque of RF-connectors, recommended by the connector manufacturers must be obeyed.

Any previous datasheet issues have now become invalid.

936.2500/c Subject to alteration.

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3 Antennes intérieures

- Kathrein 800 10277
- Kathrein 800 10465
- Kathrein 732 997
- Kathrein 800 10137

Indoor Omnidirectional Antennas
Vertical Polarization

380...470

V

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Antennen · Electronic

- The antennas need no additional groundplane.

800 10277: VPol Indoor 380–405 360° 2dBi
800 10339: VPol Indoor 405–430 360° 2dBi
800 10632: VPol Indoor 450–470 360° 2dBi

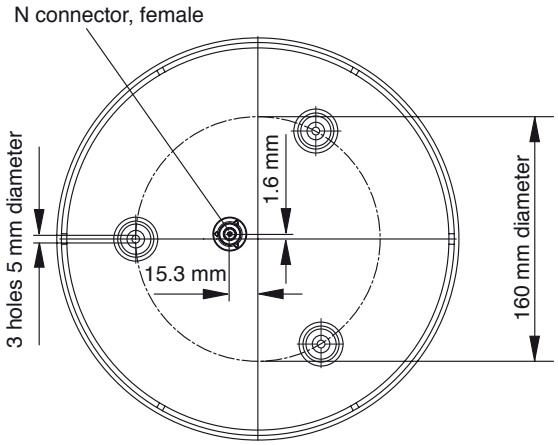
Type No.	800 10277	800 10339	800 10632
Frequency range	380 – 405 MHz	405 – 430 MHz	450 – 470 MHz
Polarization	Vertical	Vertical	Vertical
Gain	Approx. 2 dBi	Approx. 2 dBi	Approx. 2 dBi
Impedance	50 Ω	50 Ω	50 Ω
VSWR	< 2.0	< 2.0	< 2.0
Max. power	50 W (at 50 °C ambient temperature)		
Input	1 x N female		
Protection class	IP 30		
Weight	429 g		
Packing size	267 x 267 x 114 mm		
Diameter	258 mm		
Height	77 mm (without connector)		

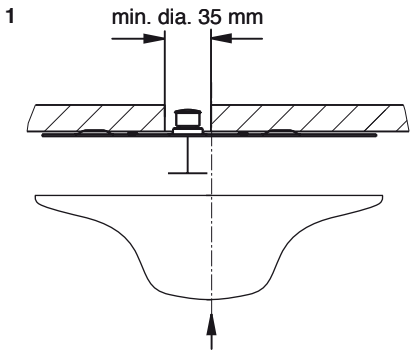
Material: Reflector: Aluminium.
Radome: High impact polystyrol, colour: White.
Additional painting is possible.

Mounting: Three holes in the base enable a mounting on the ceiling. Two types of screws are supplied. For the N connector a hole in the ceiling with a diameter of 35 mm is required.

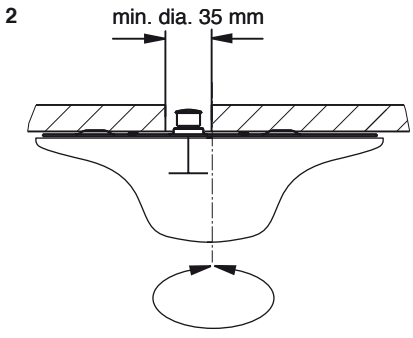
Grounding: All metal parts including the inner conductor are DC grounded.

Available accessories: Power splitters (380 – 512 MHz)

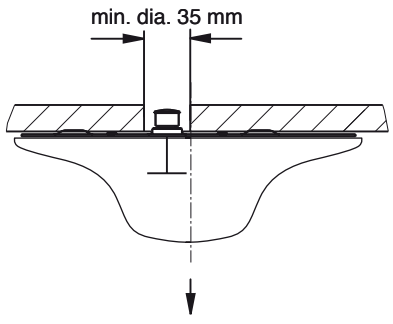




Press radome against installed reflector.



Rotate radome until it locks in place.



Pull downwards to remove radome.

936.2817/b Subject to alteration.

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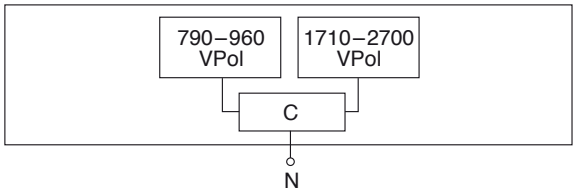
Indoor Multi-band Direct. Antenna
Vertical Polarization
Half-power Beam Width
Integrated Combiner

790–960	1710–2700
V	V
90°	90°
C	

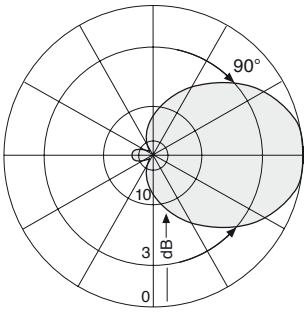
KATHREIN
Antennen · Electronic

VVPol Indoor 790–960/1710–2700 C 90° 7dBi

Type No.	800 10465
Frequency range	790 – 960 MHz / 1710 – 2700 MHz
Polarization	Vertical
Gain	Approx. 7 dBi
Half-power beam width	Horizontal: Approx. 90°
Impedance	50 Ω
VSWR	790 – 806 MHz: < 2.2 806 – 960 MHz: < 2.0 1710 – 2700 MHz: < 2.0
Max. power	50 W (at 50 °C ambient temperature)
Input	Cable RG 223/CU of 1m length, white, with N female connector
Protection class	IP 30
Weight	500 g
Packing size	363 x 152 x 62 mm
Height/width/depth	231 / 140 / 50 mm

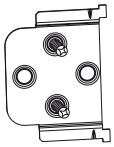


Material:	Reflector: Aluminum. Radome: High impact polystyrol, colour: White. Additional painting is possible. Mounting plates: Stainless steel.
Mounting:	Two holes of 6 mm diameter in the mounting plate. Screws are not supplied. Avoid to stress the cable.
Grounding:	All metal parts inclusive the inner conductor are DC grounded.
Available accessories:	Broadband power splitters (694 – 3800 MHz) and tappers (790 – 2500 MHz).

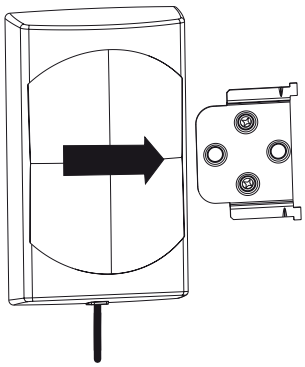


Horizontal Pattern

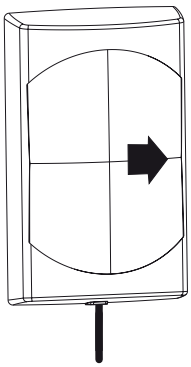
Mounting:



Mount the attachment plate to the wall using two screws of 4 mm diameter in the position as indicated.



Align the antenna over the attachment plate.



Pull the antenna to the stop.

936.3036/a Subject to alteration.

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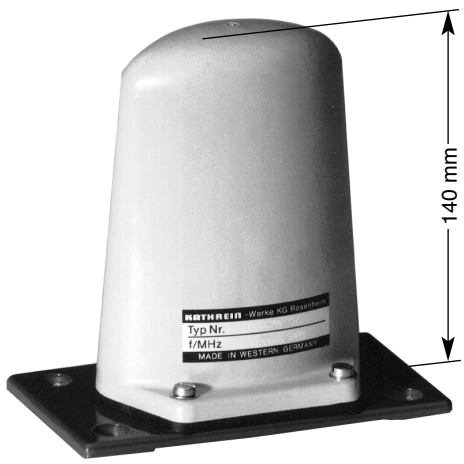
Lok-Antenne
380 – 412 MHz
732 997

KATHREIN
Antennen · Electronic

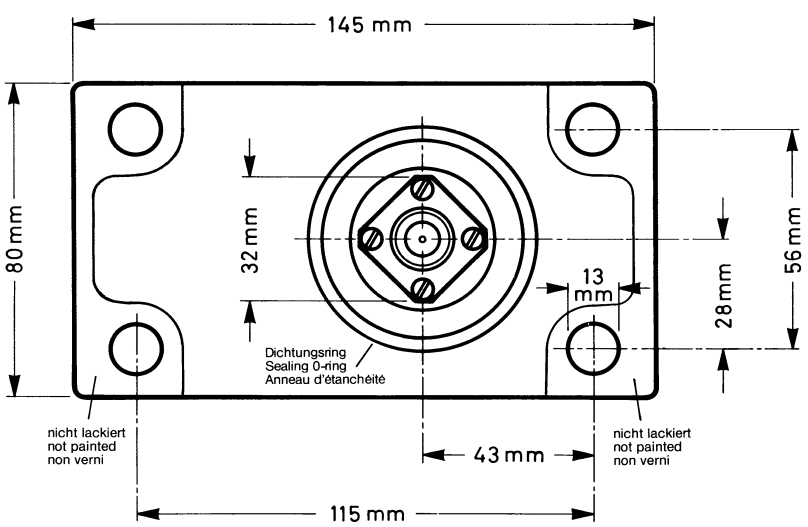
• Besonders kurze Breitband-Antenne in Fiberglas-Schutzhaube.

Typ Nr.	732 997
Eingang	N-Buchse
Frequenzbereich	380 – 412 MHz
VSWR	< 1,5
Gewinn	0 dB (bezogen auf den λ/4-Strahler)
Impedanz	50 Ω
Polarisation	Vertikal
Max. Belastung	200 W (bei 50 °C Umgebungstemperatur)
Gewicht	0,5 kg
Verpackungsaußenmaße	151 mm x 87 mm x 210 mm



Material:	Strahler und Flansch: Aluminium. Schutzhaube: Fiberglas, Farbe: Hellgrau. Alle Schrauben und Muttern: Rostfreier Stahl.
Befestigung:	Auf einer leitenden Fläche mit einer Mindestgröße von 100 cm x 100 cm mit 4 Stehbolzen M10.
Erdung und Hochspannungsschutz:	Die Antenne ist blitzgeschützt und gesichert bei Berührung mit Hochspannungsleitungen, da alle Metallteile an Masse liegen.

Montageflansch:



Montagebohrung für den Anschlussstecker: Ø 33 mm (max. Ø 35 mm).

Hinweis: Montagefläche lackfrei halten für Massekontakt!

936.2905 Änderungen vorbehalten.

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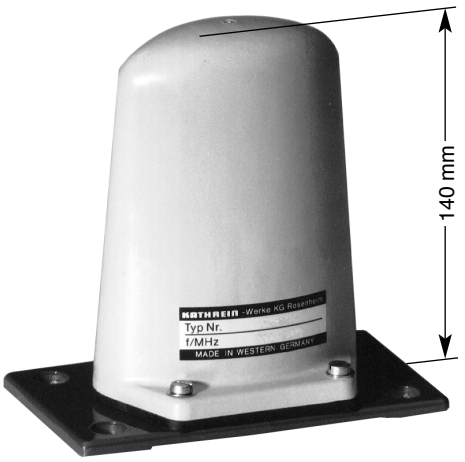
Train Antenna
380 – 412 MHz
732 997

KATHREIN
Antennen · Electronic

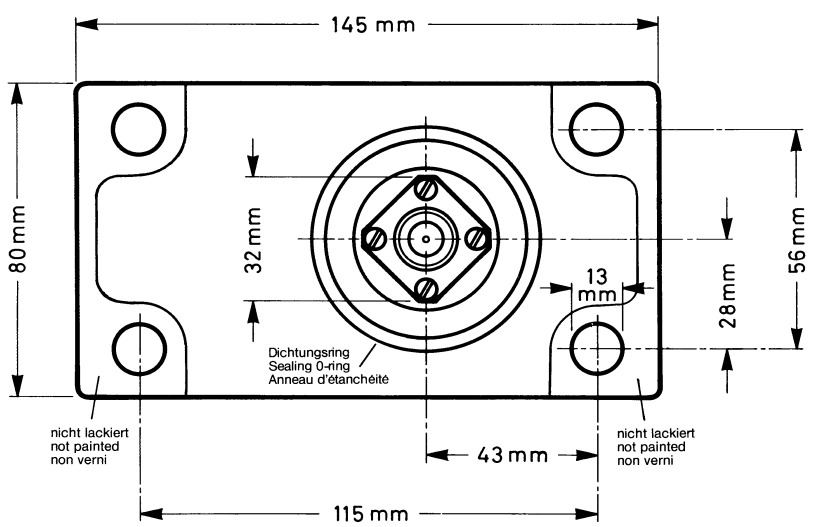
• Low profile broadband antenna in fiberglass radome.

Type No.	732 997
Input	N female
Frequency range	380 – 412 MHz
VSWR	< 1.5
Gain	0 dB (ref. to the quarter-wave antenna)
Impedance	50 Ω
Polarization	Vertical
Max. power	200 W (at 50 °C ambient temperature)
Weight	0.5 kg
Packing size (outside)	151 mm x 87 mm x 210 mm



Material:	Radiator and flange: Aluminum. Radome: Fiberglass; Colour: Light grey. All screws and nuts: Stainless steel.
Mounting:	On a conductive surface with a minimum size of 100 cm x 100 cm with 4 studs M10.
Grounding and high voltage protection:	This antenna is D.C. grounded to protect against lightning and high-tension lines.

Mounting flange:



Mounting hole for the connector: 33 mm (max. 35 mm) diameter.

Note: Keep mounting surface clear of paint for electrical contact.

936.2905 Subject to alteration.

Internet: http://www.kathrein.de

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Indoor Multi-band Omni Antenna
Vertical Polarization

876 – 960 | 1710 – 2500

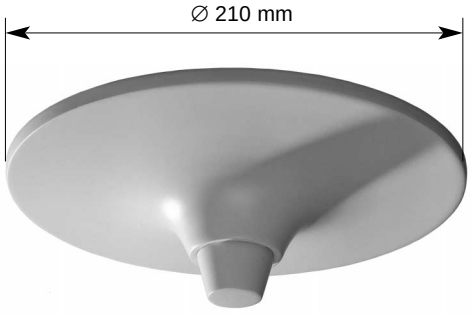
V

KATHREIN
Antennen · Electronic

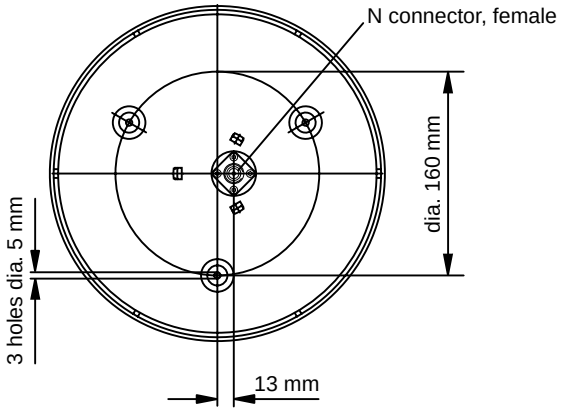
- The antennas need no additional groundplane.

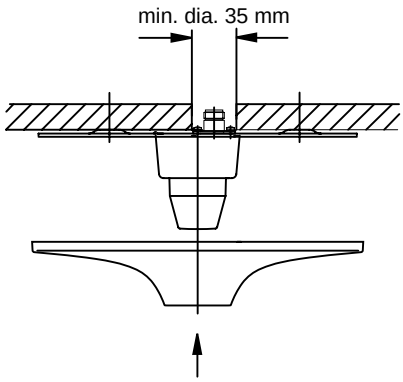
VPol Indoor 876–960/1710–2500 360° 2dBi

Type No.	800 10137
Frequency range	876 – 960 MHz 1710 – 2500 MHz
Polarization	Vertical
Gain	2 dBi
Impedance	50 Ω
VSWR	876 – 890 MHz: < 1.9 890 – 960 MHz: < 1.6 1710 – 2170 MHz: < 1.6 2170 – 2500 MHz: < 2.0
Max. power (per band)	50 W (at 50 °C ambient temperature)
Input	1 x N female
Weight	300 g
Diameter	210 mm
Height	78 mm (without connector)



Material:	Base: Aluminum. Protective housing: High impact polystyrol, colour: White. Additional painting is possible.
Mounting:	Three holes in the base enable a mounting on the ceiling. Two types of screws are supplied. For the N connector a hole in the ceiling with a diameter of 35 mm is required.
Grounding:	All metal parts including the inner conductor are DC grounded.
Available accessories:	Broadband power splitters and tappers (800 – 2500 MHz).





Clip the protective housing into position after the antenna has been mounted with the help of the three supplied screws.

936.2254/a Subject to alteration.

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4 Répartiteurs de fréquences

- Kathrein 860 10130
- Kathrein 782 10460
- Kathrein 860 10017

Low-loss Power Splitters Multi-band

380–3800

KATHREIN
Antennen · Electronic

For indoor and outdoor use.

2-way Splitter 380–3800

Type No.	860 10130	860 10131
Connector (female)	N	7-16
Max. power (at 50 °C ambient temperature)	200 W	700 W
For connecting ... antennas	2	
Frequency range	380 – 3800 MHz	
VSWR	< 1.5	
Intermodulation IM3	< –150 dBc (2 x 43 dBm carrier)	
Impedance	50 Ω	
Insertion loss	< 0.05 dB	
Weight	750 g	870 g
Packing size	300 x 75 x 75 mm	

860 10130

860 10131

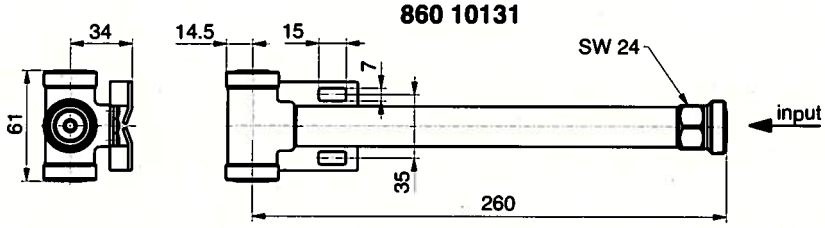
Material: Brass. Surface treatment: CuSnZn3

Mounting: Bracket for wall mounting included in the scope of supply.
For pipe mast mounting use clamps listed below (order separately).

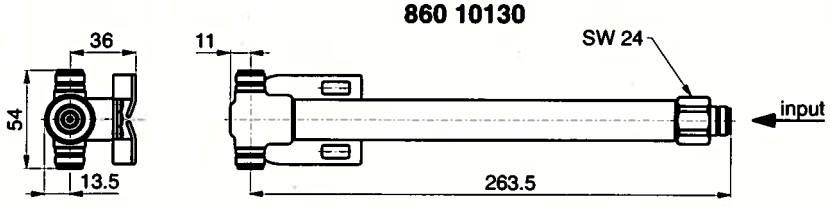
DC capability: DC transmission between all terminations (suitable for remote power supply systems).

Environmental conditions; ETS 300 019-1-4 class 4.1 E
– Low temperature: –55 °C
– High temperature (dry): +60 °C
IP 65

860 10131

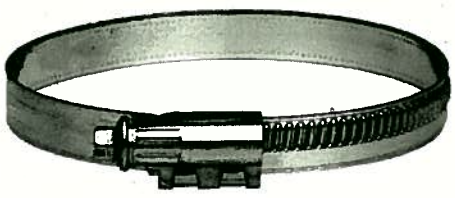


860 10130



Clamps (order separately)

Type No.	Description	Remarks
736 801	1 clamp	Mast: 34 – 60 mm diameter
736 802	1 clamp	Mast: 60 – 80 mm diameter
736 803	1 clamp	Mast: 80 – 100 mm diameter
736 804	1 clamp	Mast: 100 – 120 mm diameter
736 805	1 clamp	Mast: 120 – 140 mm diameter



736 805

936.3441/a Subject to alteration.

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Dual-Band Combiner

KATHREIN
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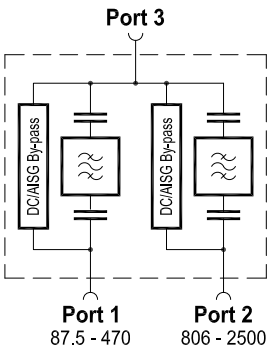
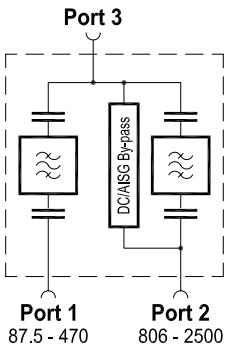
50 – 470 MHz	806 – 2500 MHz
PMR / TETRA / TETRAPOL	CDMA 800 / GSM 900 / GSM 1800 / UMTS / WLAN

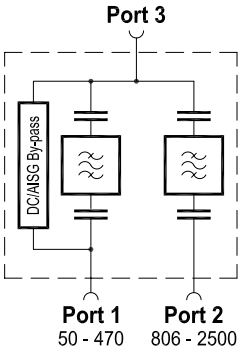
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- External DC stop available as an accessory
- **Very low insertion loss**
- **High input power**



782 10457



782 10458



782 10460

Technical Data

Type No.	782 10457	782 10458	782 10460
Pass band Band 1 Band 2	87.5 – 470 MHz 806 – 2500 MHz		50 – 470 MHz 806 – 2500 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.15 dB (87.5 – 470 MHz) < 0.15 dB (806 – 2500 MHz)		< 0.15 dB (50 – 470 MHz) < 0.15 dB (806 – 2500 MHz)
Isolation Port 1 ↔ Port 2	> 50 dB (250 – 470 / 806 – 2500 MHz) > 40 dB (87.5 – 250 MHz)		> 50 dB (50 – 470 / 806 – 2500 MHz)
VSWR	< 1.25 (87.5 – 470 / 806 – 960 / 1710 – 2500 MHz)		< 1.25 (50 – 470 / 806 – 960 / 1710 – 2500 MHz)
Impedance	50 Ω		
Input power Band 1 Band 2	< 500 W < 500 W		
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)		
Temperature range	–55 ... +60 °C		
Connectors	7-16 female, long neck		
Application	Indoor or outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop**
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set		
Weight	4 kg		
Dimensions (w x h x d)	122 x 64 x 364.3 mm (including mounting brackets)		

936.2967/b Subject to alteration.

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Dual-Band Combiner

50 – 470 MHz
PMR / TETRA / TETRAPOL

806 – 2500 MHz
CDMA 800 / GSM 900 / GSM 1800 / UMTS / WLAN

KATHREIN
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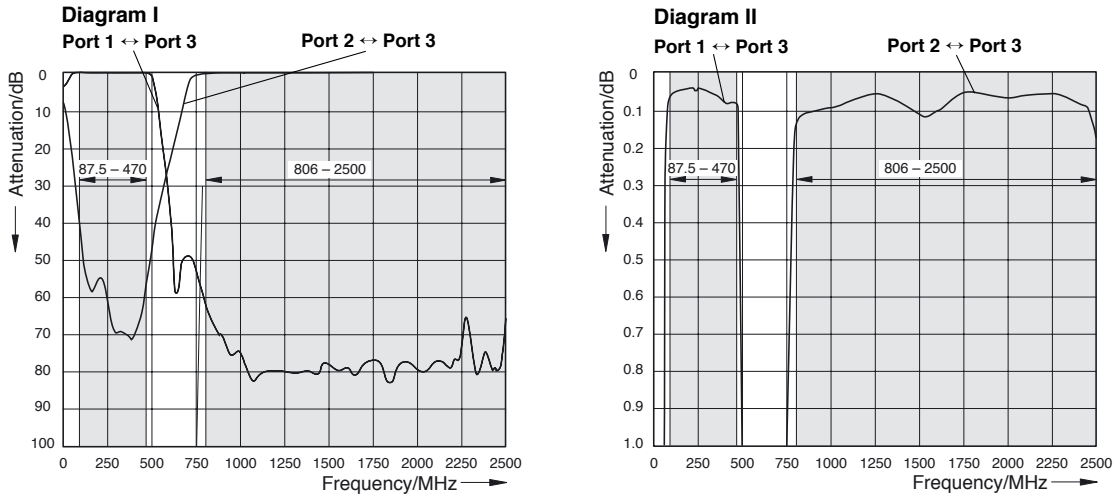
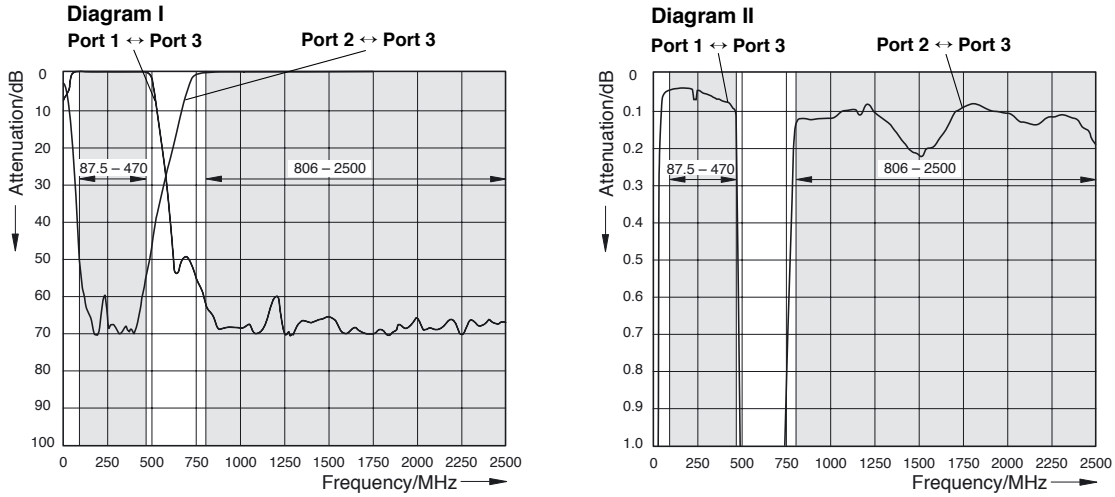
Typical Attenuation Curves

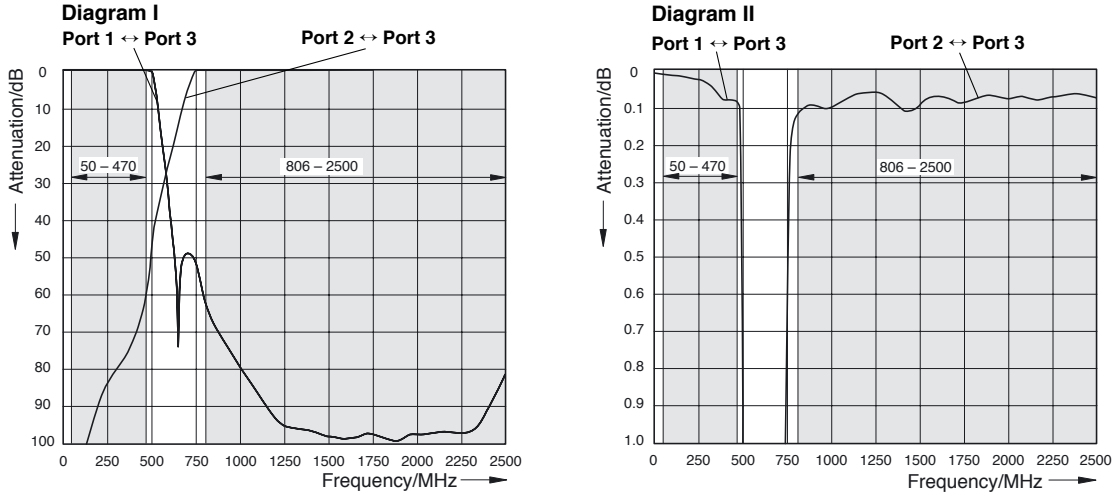
782 10457



782 10458



782 10460



936.2967/b Subject to alteration.

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Dual-Band Combiner

50 – 470 MHz
PMR / TETRA / TETRAPOL

806 – 2500 MHz
CDMA 800 / GSM 900 / GSM 1800 / UMTS / WLAN

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Accessories (order separately)

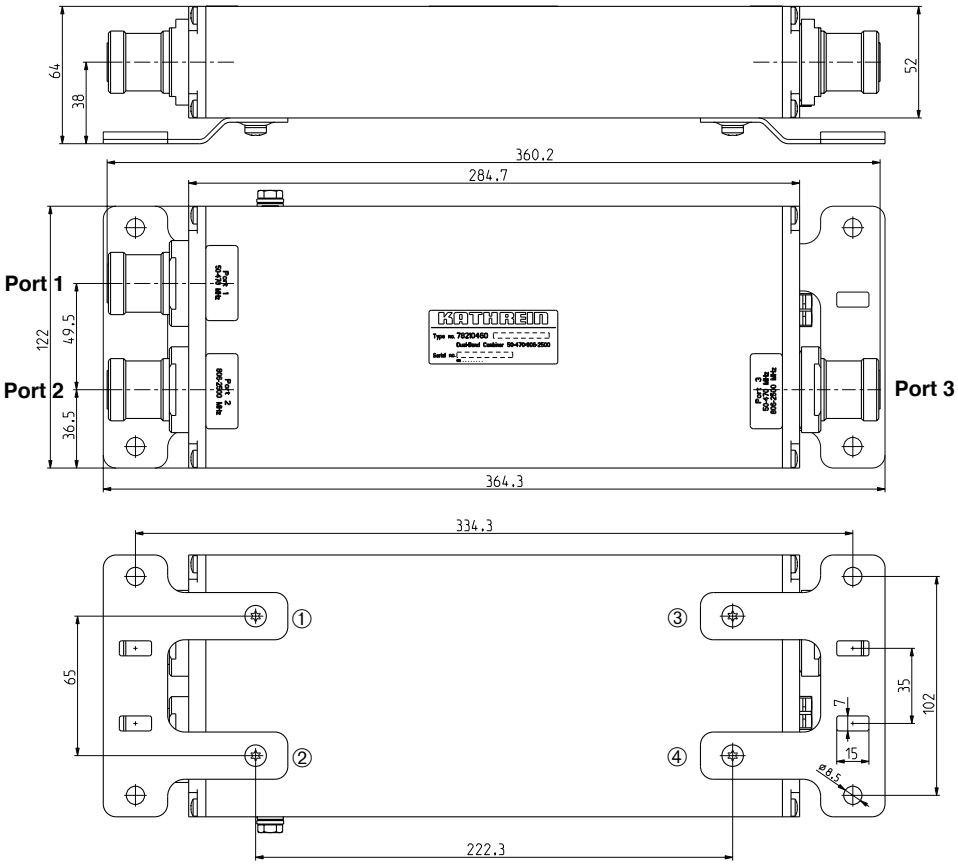
Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Type No.	Description
793 301	DC stop
784 10367	50-Ω load 1.5 W indoor or outdoor

Clamp Set

DC stop

50-Ω load



Please note:

The mounting brackets can be removed by loosening the screws ① to ④ (M5 x 10) and replaced with other means of mounting, always provided that the max. drilled depth of 8.5 mm is respected with the choice of replacement screws.

As a result of more stringent legal regulations and judgements regarding product liability, we are obliged to point out certain risks that may arise when products are used under extraordinary operating conditions.

Extraordinary operating conditions, such as heavy icing or exceptional dynamic stress (e.g. strain caused by oscillating support structures), may result in the breakage of a mast mounted device or even cause it to fall to the ground.

These facts must be considered during the site planning process.

The Dual-band Combiners are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E and have passed environmental tests as recommended in ETS 300 019-2-4.

The installation team must be properly qualified and also be familiar with the relevant national safety regulations.

The details given in our data sheets have to be followed carefully when installing the antennas, filters, combiners, amplifiers and accessories.

The limits for the coupling torque of RF connectors, recommended by the connector manufacturers must be obeyed.

Terminate unused inputs with a suitable 50 Ohm load, e.g. 784 10367.

Any previous datasheet issues have now become invalid.

936.2967/b Subject to alteration.

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Multi-band Low-loss Power Splitters 800–2500

KATHREIN
Antennen · Electronic

For indoor use.

2-way Splitter 800–2500
3-way Splitter 800–2500
4-way Splitter 800–2500

Type No.	860 10017	860 10018	860 10019
Frequency range	800 – 2500 MHz		
For connecting ... antennas	2	3	4
Insertion loss	< 0.05 dB		
Impedance	50 Ω		
VSWR	< 1.25	< 1.25	< 1.3
Intermodulation IM3 (2 x 43 dBm carrier)	< –150 dBc		
Max. power	100 W (at 50 °C ambient temperature)		
Connector	N female		
Weight	approx. 0.6 kg		
Profile cross-section	25 x 25 mm		
Packing size	242 x 110 x 95 mm		
Max. size	204 / 63 / 41 mm		

Material: Housing: Aluminum.
Inner conductor: Brass.

DC capability: DC transmission between all terminations
(suitbale for remote power supply systems).

Input
860 10019

936.2248 Subject to alteration.

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